

Cisco CCNP Implementing Service Provider Advanced Routing Solutions (300-510 SPRI) v1.1

Advance your networking skills with this SPRI Online Training course for the Cisco 300-510 SPRI v1.1 exam. Ideal for professionals in service provider environments, this training covers advanced routing technologies essential for maintaining complex digital networks. Aligned with the latest 300-510 SPRI exam updates, it includes vital topics like CGNAT, NAT64, MAP-T, SRv6 with Flexible Algorithm, and multicast protocols such as IGMPv3, MLD, and Phantom RP. Whether you're earning your CCNP Service Provider certification or sharpening your skills, this course delivers practical, job-ready expertise.

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WEEK 1

Building a Cisco Service Provider Lab

- Issues with IOS XR on EVE-NG
- The Physical Server
- VMWare ESXi Configuration
- EVE-NG Topology Design
- Management and Data Networks
- Cisco IOS XE and IOS XR Images
- Baseline Configurations
- Updates to the SPCOR and SPRI Labs v1.1
- Validation

Multiarea OSPF and LSA Types

- Introduction
- Single-Area Overview
- Multiarea Overview
- Examine Multiarea OSPF
- LSA Types
- Examine the Database
- Challenge

OSPF Area Types

- Introduction

WEEK 2

- Describe Area Types
- Examine Stub and Total Stub Area Types
- Examine NSSA Type
- NSSA Advanced Configuration

Total NSSA Type

Challenge

OSPF Path Selection

Introduction

Path Selection Overview

Internal vs. External Routes

Intra-Area vs. Inter-Area Routes

External Type 1 vs. Type 2 Routes

Automatic and Manual Cost

Forwarding Address and Forwarding Metric

External vs. NSSA Routes

Challenge

Implement OSPF Summarization

Introduction

Importance of Summarization

Implement Internal Summarization

Summarization as a Filter

Implement External Summarization

Limitations of Internal and External Summarization

Inject the Ultimate Summary

Challenge

Authentication, Virtual Links, and Optimization

Introduction

Configure OSPF Authentication

Describe OSPF Virtual Links

Configure OSPF Virtual Links

Adjust OSPF Timers

NSF and NSR

Challenge

OSPFv3

Introduction

Discover OSPFv3

The New LSA Types

Implement OSPFv3

Implement OSPFv3 Summarization

OSPFv3 Authentication and Virtual Links

WEEK 4

Challenge

Troubleshooting OSPF

Introduction

Trouble Ticket 1

Trouble Ticket 2

Trouble Ticket 3

Trouble Ticket 4

Trouble Ticket 5

Trouble Ticket 6

Challenge

WEEK 3

IS-IS Overview

Introduction

Introduction to IS-IS

The IS-IS Hierarchy

Describe IS-IS Design Concepts

IS-IS Addressing

IS-IS Best Path Selection

Challenge

Explain IS-IS Operations

Introduction

Adjacency Overview

IS-IS Packet Types

DIS Operation

WEEK 5

IS-IS Link-State Database

Challenge

Implementing IS-IS

Introduction

Planning the Deployment

Implement the First Area

Configure An Additional Area

Redundancy in Transit Areas

Summarization and External Routes

Challenge

Examine IS-IS IPv6 Support

Introduction

IPv6 Review

Explore IPv6

IS-IS Support for IPv6

Configure IS-IS Area for IPv6

Summarization and External IPv6 Routing

Challenge

Implementing IS-IS Advanced Features

Introduction

NSF and NSR

WEEK 6

Prefix Suppression

Route Leaking

Authentication

Challenge

Troubleshooting IS-IS

Introduction

Trouble Ticket 1

Trouble Ticket 2

Trouble Ticket 3

Trouble Ticket 4

Trouble Ticket 5

Challenge

Scaling iBGP Neighborships

Introduction

Designing Our BGP Environment

Configuring the iBGP Peers
Configuring the Confederation Peers
Configuring the eBGP Peers and Injecting Networks
Verifying and Troubleshooting the Confederation
Configuring a Route-Reflector
Configuring a Redundant Route-Reflector
Challenge

WEEK 7

Explain Outbound BGP Path Selection

Introduction
Introducing the BGP Best Path Concept
Examine the BGP Best Path Criteria
Using Weight
Using Local Preference
Challenge

Implementing Outbound BGP Path Selection

Introduction
Exploring Soft Reconfiguration and Route Refresh
Implement Soft Reconfiguration and Route Refresh
Implementing the Weight Attribute
Implementing Local Preference
Challenge

Explain Inbound BGP Path Selection

Introduction
Using AS Path Prepending
Exploring AS Path Prepending

Using Multi-Exit Discriminators
Exploring Deterministic MED
Exploring Multi-Exit Discriminators

WEEK 8

Challenge

Implementing Inbound BGP Path Selection

Introduction
Implementing AS-Path Prepending
Implementing MED
Implementing Local Preference with Communities
Challenge

Implementing BGP Security

Introduction
Explain the Top Potential Threats
Explore BGP's Filtering Options
Examine Route Limiting in BGP
Implementing BGP Authentication
Implementing BGP TTL Security
Challenge

Implementing BGP Advanced Features

Introduction
Exploring BGP Route Dampening

WEEK 9

Implementing BGP Route Dampening
Improving BGP Convergence
Implementing BGP Convergence Techniques
Challenge

Troubleshooting BGP

Introduction
Trouble Ticket 1
Trouble Ticket 2
Trouble Ticket 3
Trouble Ticket 4
Trouble Ticket 5
Challenge

Explaining Route Filtering

Introduction
Filtering with Access-Lists
Implementing Access-Lists
Filtering with Prefix-Lists
Implementing Prefix-Lists
Challenge

WEEK 10

Exploring Advanced Route Filtering

Introduction
Filtering with Route-Maps
Implementing Route-Maps
Filtering with RPL
RPL Advanced Features

Challenge

Exploring BGP Route Filtering Options

Introduction
BGP Filtering with Prefix-lists
Outbound Route Filtering (ORF)
BGP Filtering with AS-Path Filters
BGP Destination Based RTBH
BGP Source Based RTBH
Challenge

Configuring Route Redistribution

Introduction
Introducing Redistribution

WEEK 11

Configuring Redistribution into IS-IS
Configuring Redistribution into OSPF
Configuring Redistribution into RIP
Configuring Redistribution into EIGRP
Now, About that Loop....
Challenge

Exploring MPLS

Introduction
Introduction to MPLS
Explore MPLS Labels
Label Stacks and IP Forwarding
MPLS VPNs

Traffic Engineering

Challenge

Examining Label Distribution Protocol

Introduction

LDP Overview

LDP Neighborship

Session Protection

Graceful Restart and NSR

IGP Synchronization

Autoconfiguration

Challenge

WEEK 12

Exploring MPLS Traffic Engineering

Introduction

Why Traffic Engineering

Introduction to Traffic Engineering

The Six Traffic Engineering Processes

RSVP in Traffic Engineering

CSPF and Path Selection

Traffic Steering

Challenge

Implementing MPLS TE

Introduction

Configure TE in the Network Core

Configure RSVP in the Network Core

Configure the Core IGP for TE

Configure TE Tunnels

Configure Traffic Steering

Challenge

Discovering and Implementing MPLS Layer 2 VPNs

Introduction

Introduction to L2 VPN

L2 VPN Types

VPLS Overview

Implement VPLS

WEEK 13

EoMPLS Overview

Implement EoMPLS

Challenge

Discovering MPLS Layer 3 VPNs

Introduction

Introduction to L3 VPN

Virtual Routers and Forwarders

Routing in the Network Core

Controlling Route Distribution

Central Services VPNs

CE-PE Routing

Challenge

Implementing MPLS Layer 3 VPNs

Introduction

Optimize the Network Core
Configure the VRFs
Configure MP-BGP in the Network Core
Configure a CE-PE Protocol
Verify and Examine Traffic Flow
Challenge

Implementing OSPF as the CE-PE

Introduction
Controlling OSPF Route Types

WEEK 14

Examining the OSPF Downward Bit
Implement SHAM Links
Challenge

Implementing Additional CE-PEs

Introduction
Implement EIGRP
Implement SoO with EIGRP
Implement RIPv2
Implement BGP
Challenge

Implementing L3 VPN Advanced Features

Introduction
PHP Operation
TTL Propagation
Route Leaking

Label Control

WEEK 15

Challenge

Troubleshooting MPLS

Introduction
Trouble Ticket 1
Trouble Ticket 2
Trouble Ticket 3
Trouble Ticket 4
Trouble Ticket 5
Challenge

Discovering Segment Routing

Introduction
Introduction to Segment Routing
The SR Control Plane
Segment Types
Topology Independent Loop Free Alternative
Segment Routing Key Concepts
Challenge

Implementing Segment Routing

Introduction
Configure IS-IS to Support SR
Configure Prefix-SIDs

WEEK 16

Configure SR Label Preference

Remove LDP

Configure OSPF to Support SR

Challenge

Segment Routing Advanced Features

Discover SRv6

SRv6 Components

Segment Routing Flexible Algorithm

SR Flex-Algo vs. Traditional Protocols

Challenge

Implementing Segment Routing TE

Introduction

Configure MPLS TE

Configure Segment Routing

Configure BGP and PCEP

Configure TE Policies and Tunnels

Challenge

Troubleshooting Segment Routing

Introduction

Trouble Ticket 1

WEEK 17

Trouble Ticket 2

Trouble Ticket 3

Trouble Ticket 4

Trouble Ticket 5

Challenge

Discovering IP Multicast

Introduction

Multicast Overview

Multicast Addressing

IPv6 Multicast Addressing

Multicast Routing Protocols

Challenge

Discovering Multicast Routing

Introduction

Multicast Operation

Reverse Path Forwarding

Dense Mode Operation

WEEK 18

Sparse Mode Operation

Challenge

Multicast First Hop Protocols

Introduction

What Are First Hop Protocols?

IGMPv1

IGMPv2

IGMPv3

MLDv1

MLDv2

Challenge

Discovering the RP

Introduction

Exploring Static RP

Exploring Auto-RP

Exploring BSR

Exploring Anycast RP

Exploring Phantom RP

Challenge

Implementing IP Multicast

Introduction

Enable PIM-SM

Configure a Static RP

Discovering IGMP

Examining the Shared Tree

WEEK 19

Building the Source Tree

Challenge

Implementing RP Discovery Options

Introduction

Verify Static RP

Configure AutoRP

Redundant RPs with AutoRP

Configure BSR

Redundant RPs with BSR

Challenge

Exploring PIM Enhancements

Introduction

Anycast RP with BSR

Discovering Bidirectional PIM

Implementing Bidirectional PIM

Discovering Source Specific Multicast (SSM)

Implementing Source Specific Multicast

SSM without IGMP Version 3

WEEK 20

Challenge

Exploring IPv6 Transition Options

Introduction

Using Dual Stack

Discovering NAT64

Explore CGNAT

Examine MAP

Exploring MAP-T

Discovering GRE and 6in4 Tunnels

Discovering 6to4 Automatic Tunnels

Discovering 6RD Tunnels

Supporting IPv6 Over MPLS

Challenge